

ABSTRACT

This invention involves a series of articles, dispersions, compositions, methods, and kits. Several aspects of the invention involve dispersed particles made from polymers having a delocalized π -orbital backbone structure, as well as methods for making and using such particles. The delocalized π -orbital backbone allows the polymer to have a high degree of luminosity, useful in many embodiments of the invention. The polymers of this invention can also have bulky substituents to prevent intermolecular π - π interactions that can decrease luminosity. The polymer may also have charged side chains immobilized relative to the backbone, which can allow the polymer to be made into stably suspended micro- or nanoparticles dispersed in solution, sometimes with very narrow size distributions. In some embodiments, depending on the conditions used to synthesize and prepare the particles, the particles each consist of a single polymer molecule. Side groups, including biological, biochemical, or chemical molecules, can be attached to the polymer to provide additional functions, such as altering the luminosity of the polymer, or allowing the polymer to bind to certain molecules, such as in a chemical sensor or in a biological assay. As the binding of a molecule to a side group on the polymer can affect the structure of the polymer or alter the luminosity of the particle, the particles of the invention may be used, in certain embodiments, to detect the presence of single molecules.